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Ping-tung Aero Engine Research Center, China (S)

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PING-TUNG AERO ENGINE RESEARCH CENTER CHINA (S)

INTRODUCTION

1. (S/WN) This report discusses Ping-tung Aero Engine Research Center in Sichuan Province, south China. This center is in the late stage of construction and is expected to be fully operational by 1986.[1] It contains China's most complete aircraft engine component testing facilities and its only altitude simulation engine test facility. Ping-tung Aero Engine Research Center is involved in aeronautical engine and component testing and in engineering applications of gas turbine technology.[1] Research-and-development experiments in areas including engine research, turbomachinery, combustion, aerodynamics, control systems, facility design, and simulated high-altitude testing are conducted at the research center. 25X1

2. (S/WN) Ping-tung Aero Engine Research Center, also called the Dragon Gate Mountain Engine Research-and-Development Center and the Aero-Gas-Turbine Research Center, is under the direct control of the Third Ministry of Machine Building, the organization responsible for planning all phases of the aviation industry in China.[1] The center—approximately 80 nautical miles (nm) northeast of the city of Chengdu—is in a mountainous area 16 nm northeast of China's major aerodynamics complex at Xian Aerospace Research-and-Development Facility (25X1

3. (S/WN) While touring selected facilities in China, scientists and engineers from the United States visited the research center in November 1979 and June 1980. Specific functional activities, performance data, and the identification of several facilities are based on the delegation's report.[1]

DESCRIPTION

4. (S/WN) The Fau Chiang (River) separates the Ping-tung Aero Engine Research Center (Figure 1) into two research sections: a high-altitude test facility and an aircraft engine component test facility. The high-altitude test facility is on the west bank of the river, and the aircraft engine component test facility is across the river approximately 0.7 nm to the east.

High-Altitude Test Facility

5. (S/WN) The wall-secured high-altitude test facility (Figure 2) is in a linear configuration, providing sufficient space for future expansion. The facility can be separated into four areas: the electrical power supply area on the eastern edge of the facility, the compressor/air treatment area in the center, the test/test support area on the west side, and the support area outside the west end of the walled perimeter. The support area contains the fuel, water, and supply facilities. It also contains general support facilities.

Electrical Power Supply Area

6. (S/WN) The electrical power supply area (Figures 2 and 3) consists of a low-voltage switching/rectifier building, a transformer/maintenance/low-voltage switching building, and a transformer yard. The capacity of the power supply area probably ranges from 20 to 81 megawatts. Two three-phase transformers in this area are estimated to have a capacity of 10.0 to 40.5 megawatts each. A dual-tower, high-voltage powerline provides the electrical power from outside sources.

Compressor/Air Treatment Area

7. (S/WN) A large, two-bay compressor building, an engine inlet test building, an air dryer building, three air heater towers, and several support buildings are in the compressor air treatment area (Figures 2 and 3). The large compressor building contains 14 Chinese-made multistage compressors which can be used in series or in parallel to supply high-pressure inlet air.[1] Ten of these compressors are four-stage units with a pressure ratio of 4 to 1 and a flow rate of 125 kilograms per second (kg/sec) at sea level static conditions. The four smaller compressors are five-stage units with a pressure ratio of 6 to 1 and a flow rate of 80 kg/sec. These four compressors are used for controlling atmospheric pressure during simulated altitude tests.[1] Five vertical tanks adjacent to the air dryer building contain silica gel, which is used as an air-drying medium.[1] The three gas-fired, indirect air heater towers have the capacity to heat up to 70 kg/sec of inlet air to 510 degrees centigrade.[1] The towers, which appear to be externally complete, are not connected to the altitude simulation engine test building.

Test/Test Support Area

8. (S/WN) The test/test support area (Figures 2 and 3) consists of the altitude simulation engine test building, a sea level engine test building, and four test support buildings. The altitude simulation engine

test building, which will probably be operational in 1986, will have the capacity to simulate conditions up to an altitude of 25 kilometers (km) and a flight speed of Mach 2.5.[1] This engine test building has a 23-meter-long by [redacted] single test chamber. A thrust-measuring system will be built into this test chamber.[1] The maximum airflow rate in the test chamber is approximately 125 kg/sec at sea level static conditions.[1] The sea level engine test building probably will be used for routine testing. 25X1

Support Area

9. (S/WN) The support area consists of a fuel-blending facility, a large reservoir, and general storage/support areas. The separately secured fuel-blending facility contains six small, rectangular tanks and two large, circular underground fuel storage tanks. The large reservoir (completed in 1973) is 96 meters higher than the test/test support area. The reservoir was constructed on the side of a mountain, and the nearby Fau Chiang is its water source. A [redacted] pipeline transports water coolant from the reservoir to a surge control facility (Figures 2 and 3) at the base of the mountain. A 1-meter-diameter pipeline extends from the surge control facility to the compressor building. 25X1

Aircraft Engine Component Test Facility

10. (S/WN) The aircraft engine component test facility (Figure 4) consists of an engine component test area, an administration/engineering area, a storage/support area, and a small housing area.

Aircraft Engine Component Test Area

11. (S/WN) The aircraft engine component test area (Figure 5) contains six compressor buildings, five probable blow down wind tunnel buildings, a large laboratory building, a high-pressure storage tank facility, a test support building, and several workshop buildings. The performance of major engine components is assessed at test facilities in this area, and new engine components are evaluated there. Also at these facilities, modifications to existing production designs are made.[1]

Administration/Engineering Area

12. (S/WN) The main building in the administration/engineering area (Figure 4) is a six-story structure with four-story wings on each end. This building contains 12,400 square meters of floorspace. A smaller, two-story probable administration/engineering building and several small support buildings are also in the area.

Storage/Support Area

13. (S/WN) The storage/support area (Figure 4) consists of a motor pool with vehicle storage buildings, several shed-type storage buildings, and open storage areas.

Housing Area

14. (S/WN) The small housing area (Figure 4) consists of nine multistory, barracks-type buildings. Additional housing is in the surrounding area.

Imagery Analyst's Comments

15. (S/WN) The development of Ping-tung Aero Engine Research Center indicates that the Third Ministry of Machine Building has given high priority to developing China's air-breathing engines. The potential research-and-development capabilities of the research center should decrease China's dependence on imported technology and facilitate native aircraft engine design. Data obtained at the high-altitude test facility on the characteristics of air-breathing propulsion systems will reduce the time required for flight testing aircraft engines and minimize the risks and expense of actual flight testing.

REFERENCES

IMAGERY

(S/WN) All applicable satellite imagery acquired from [redacted] was used in the preparation of this report. 25X1

DOCUMENT

1. NASA. *Trip Report of NASA Aeronautics Delegation to China, June 15—29, 1980 (U),* no publication date listed (CONFIDENTIAL [redacted] 25X1
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(S) Comments and queries regarding this report are welcome. They may be directed to [redacted] Asian Forces Division, Imagery Exploitation Group, NPIC, [redacted] 25X1
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